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PATENT
Attorney Docket No. 1263-0104

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:)
LOUIS J. LENICK et al.)
Serial No.: 10/091,779)
Filed: March 5, 2002)
Group Art Unit: 3682)
Examiner: William C. Joyce)
For: BEARING ASSEMBLY AND LOCKING)
COLLAR)
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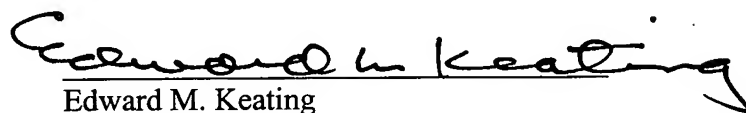
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Mail Stop Appeal Brief
Commissioner for Patents
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

(1) REAL PARTY IN INTEREST

The real party in interest in this appeal is Peer Bearing Company, assignee of the invention, which assignment was recorded in the United States Patent and Trademark Office on March 5, 2002 at Reel No. 012677 and Frame No.0780.

(2) RELATED APPEALS AND INTERFERENCES

None.

(3) STATUS OF CLAIMS

Claims 1 and 2 have been rejected and the rejection is final. Applicants are appealing from the rejection of claims 1 and 2.

(4) STATUS OF AMENDMENTS

No amendments were filed after final rejection.

(5) SUMMARY OF INVENTION

This invention is directed to a bearing assembly and locking collar. The bearing assembly 11 includes an inner race member 15 surrounded by an outer race member 17 (paragraph 11, lines 2 and 3). The bearing assembly 11 is mounted to a rotatable shaft 13 (paragraph 12, line 1). Similar to conventional bearing assemblies, applicants' invention allows for relative rotational movement between the inner and outer race members 15 and 17. The inner race member 15 rotates with the rotatable shaft while the outer race member 17 remains stationary.

In Figure 1, ball bearings 21 are positioned between the inner and outer race members 15 and 17 (paragraph 11, lines 4-5). The ball bearings 21 reduce the frictional force between the inner and outer race members 15 and 17 during rotational movement of the shaft 13. The inner race member 15 is formed with an axial extension 25 (paragraph 11, line 10). Slots 27 are formed in the axial extension and these slots 27 define fingers 29 which terminate in distal end walls 31 (paragraph 11, lines 10-11).

Applicants' invention further includes a locking collar 41 which secures the bearing assembly 11 to the rotatable shaft 13. The locking collar 41 fits over the fingers 29 formed in the axial

extension 25 of the inner race member 15 (paragraph 12, lines 1-3). In Figure 2, the locking collar includes a gap 43 with a threaded passage 47 (paragraph 12, lines 4-6). A screw 51 threads into the threaded passage 47 and reduces the gap 43 of the locking collar 41 (paragraph 12, lines 7-10). Tightening of the locking collar forces the fingers 29 against the rotatable shaft 13 to secure the bearing assembly 11 onto the shaft (paragraph 12, lines 2-3 and 7-10).

The locking collar 41 further defines a bore 53 having a larger inner diameter 55 and a smaller inner diameter 57 which are separated by annular radial stop wall 59 (paragraph 13, lines 1-2). In Figure 1, the locking collar 41 is positioned over the fingers 29 of the inner race member 15. The relative axial position of the locking collar 41 on the inner race member 15 is determined when the annular radial stop wall 59 of the locking collar engages the distal end walls 31 of the fingers 29 (paragraph 14, lines 1-3). Further movement of the locking collar to the left as viewed in Figure 1 is prevented once this engagement occurs. In this regard, the annular radial stop wall 59 of the locking collar 41 assists in locating the locking collar 41 on the fingers 29 of the inner race member 15. The locking collar also functions to mount the bearing assembly 11 to the rotatable shaft 13. During tightening of the locking collar, the larger inner diameter 55 engages the fingers 29 of the inner race member 15 so as to compress the fingers against the rotatable shaft 13 (paragraph 14, lines 3-5). The locking collar 41 rotates with the inner race member 15 during rotation of the shaft 13 while the outer race member 17 remains stationary.

(6) ISSUES

(A) Whether Claims 1-2 are unpatentable as obvious under 37 U.S.C. 103 over Mansfield (3,276,828) (hereinafter “Mansfield”) in view of Rose (5,059,053) (hereinafter “Rose”).

(B) Whether Claims 1-2 are unpatentable as obvious under 35 U.S.C. 103 over Koss (4,403,814) (hereinafter “Koss”) in view of Rose .

(C) Whether Claims 1-2 are unpatentable as obvious under 35 U.S.C. 103 over Larson (5,630,671) (hereinafter “Larson”) in view of Rose.

(7) GROUPING OF CLAIMS

Claims 1-2 stand or fall together. Claim 1 is an independent claim and claim 2 depends directly from independent claim 1.

(8) ARGUMENT

(A) Whether Claims 1-2 are unpatentable as obvious under 37 U.S.C. 103 over Mansfield (3,276,828) (hereinafter “Mansfield”) in view of Rose (5,059,053) (hereinafter “Rose”).

In the Final Office Action, Mansfield was applied in combination with Rose to reject claim

1. Claim 1 is recited in the Appendix. In particular, Mansfield was relied upon as disclosing:

a bearing assembly having an inner ring (1) mounted on a shaft (C), the inner ring having a plurality of fingers defined by slots (6), a compressible locking collar (D) positioned circumferentially about the fingers, the locking collar having a fastener screw operable for causing the locking collar to compress the fingers into locking engagement with the shaft.

In the Final Office Action, it is conceded that Mansfield does not teach or suggest a collar with the features recited in claim 1. However, Rose is relied upon to supply the teaching that Mansfield lacks for the rejection of claim 1. At pages 2-3 of the action, Rose is claimed to teach:

a locking collar (20) having a large diameter portion and a small diameter portion, wherein the large diameter portion fits circumferentially about a plurality of fingers and the small diameter portion defines a radial wall for engaging an end wall of the fingers. Referring to the specification (column 4). Rose discloses the small

diameter portion illustrated in the Figs. [sic] can be modified to have a different shape, length, or width, while still performing its positive stop function.

Contrary to the statements of the Final Office Action, it is submitted that this combination is not supported by the teachings or suggestions provided by the cited references. In fact, the only support for such combination is taught by applicants' specification which cannot be relied upon as the basis for a rejection. As explained below, the alleged combination of Mansfield and Rose is improper and not supported based on the teachings and suggestions supplied by these references.

Mansfield discloses a bearing assembly having roller bearings 3 so as to allow relative rotational movement between the inner race ring 1 and the outer race ring 5. It is important to note that Mansfield's bearing assembly, as with conventional bearing assemblies, is mounted to a cylindrical shaft C and that the roller bearings permit relative rotational movement between the inner and outer race rings. A split clamping ring D encircles each end portion 1b of the inner race ring so as to lock the inner race ring 1 to the shaft C. Once locked, the inner race ring 1, and split clamping ring D are permitted to rotate with the shaft C and they rotate relative to the outer race ring 5 which is permitted to remain stationary.

It is conceded in the Final Office Action that Mansfield does not disclose the claimed structure for the locking collar, as recited in claim 1:

Mansfield does not disclose the collar as having a large diameter and a small diameter, wherein the large diameter portion fits circumferentially about the fingers and the small diameter portion defines a radial wall for engaging an end wall of the fingers. (Emphasis added).

Rose is relied upon in combination with Mansfield to supply the missing teaching or suggestion for the claimed features of the locking collar. However, the alleged combination is improper.

Mansfield discloses a very different structure as compared to Rose. Rose does not disclose anything remotely comparable to a bearing assembly. Rose discloses a clamp 20 for a tie rod assembly. Tie rods are conventionally used in vehicles as the linkage which connects the steering assembly to the car front wheels so as to permit movement of the front wheels in response to movement of the steering wheel by the driver. Rose's clamp 20 forms a subpart of the tie rod assembly so that each end of a tie rod cross tube 12 is properly attached to a tie rod end 14 and 14'.

In the Final Office Action, it states that it would be obvious to place Rose's clamp 20 in Mansfield's bearing assembly. Contrary to the action, Rose lacks absolutely any teaching or suggestion for combination with a bearing assembly such as that disclosed in Mansfield. Rose does not disclose that the tie rod assembly rotates about its longitudinal axis in any manner similar to the rotational movement indicative of bearing assemblies. Rather, Rose's tie rod assembly is a necessary part of a vehicle linkage between a pair of front wheels. One tie rod assembly is connected to each front wheel and both tie rod assemblies are connected to the steering wheel and rack assembly so as to synchronize turning of the pair of front wheels either to the right or left. Each tie rod assembly responds differently to transfer movement of the steering wheel into pivotal movement of the front wheels so that both front wheels are ultimately aligned in the same direction. The tie rod assembly does not rotate and has absolutely no need for combination with a bearing assembly. In fact, it is unduly speculative to presume that the tie rod assembly could be configured to rotate in any sense without interfering with the car's operation.

The prior art references do not provide the motivation to make the alleged combination of the references. Persons of skill in the art realize the unsuitability of Rose's tie rod clamp in

combination with a bearing assembly. It clearly would not be obvious to combine Mansfield and Rose in the absence of the teachings provided by applicants' disclosure.

Further evidence also teaches away from the alleged combination. The structure of Rose's tie rod clamp 20 is eccentric with the ears 24 of the clamp 20 located off to one side. This structure would unbalance the desired smooth movement provided by the bearing assembly and thus frustrate the entire purpose of the bearing assembly. It is noted that Mansfield already uses split rings D to mount the inner race ring 1 to the rotating shaft such that it would not be obvious to substitute Rose's inferior structure into the bearing assembly without applicants' specific teaching. This is an additional reason which supports the applicants' contention that the combination is improper.

The obviousness rejection is based on the hindsight provided by applicants' disclosure and, thus, is not a proper basis for a rejection of claims 1 and 2. In the absence of applicants' disclosure, there is no motivation to combine Rose's tie rod clamp with Mansfield's bearing assembly. For the above reasons, applicants respectfully submit that applicants' disclosure is being improperly used as a blueprint to pick and choose among the prior art references. Therefore, applicants respectfully request withdrawal of this rejection and allowance of the claims.

(B) Whether Claims 1-2 are unpatentable as obvious under 35 U.S.C. 103 over Koss (4,403,814) (hereinafter "Koss") in view of Rose .

In the Final Office Action, claims 1 and 2 were further rejected over the alleged combination of Koss and Rose. This combination is also improper in the absence of the teachings provided by applicants' disclosure. In Koss, a bearing assembly 10 comprises a outer race ring 11, an inner race ring 14 and ball bearings 13 disposed in between the inner and outer race rings. In Figure 2, a shaft is received within the inner race ring 14 and is mounted to the inner race ring 14 by a collar 26 so

that the inner race ring 14 which rotates with the shaft while the outer race ring 11 remains stationary (Col. 3, lines 15-22). Similar to Mansfield, Koss teaches a conventional bearing assembly.

It is conceded within the Final Office Action that Koss fails to teach or suggest the entire claimed invention:

Koss et al. do not disclose a compressible collar as having a large diameter and a small diameter, wherein the large diameter portion fits circumferentially about the fingers and the small diameter portion defines a radial wall for engaging an end wall of the fingers. (Emphasis added).

Rose is again relied upon, although this time in combination with Koss' bearing assembly, to supply the missing teaching or suggestion for rejection of the claimed invention. However, such reliance is misplaced for the same reasons as discussed above relative to the combination of Mansfield and Rose.

Rose teaches and suggests a different structure than Koss' bearing assembly. Rose does not provide any motivation that the tie rod clamp would be combinable with Koss' bearing assembly. In fact, it is obvious based on the known teachings of vehicles that the tie rod assembly does not require any bearing assemblies to function properly because the tie rod assembly does not rotate about its axis. Therefore, it is respectfully believed that such combination is entirely based on the hindsight provided by applicants' disclosure which cannot be used as a basis for the rejection. Withdrawal of this rejection and allowance of claims 1 and 2 are respectfully requested.

(C) Whether Claims 1-2 are unpatentable as obvious under 35 U.S.C. 103 over Larson (5,630,671) (hereinafter "Larson") in view of Rose.

Another rejection of claims 1 and 2 was based on the alleged combination of Larson and Rose. Similar to Mansfield and Koss, Larson discloses a conventional bearing assembly having

inner and outer race rings (with only the inner race ring 10 being shown in Larson). In Figs. 1 and 2, the inner race ring 10 is mounted to the shaft 14 by an annular collar 18 for rotation about the axis 16. Bearings are mounted in the raceway 12 so that the outer race ring does not rotate during rotation of the shaft 14 and the inner race ring 10. Similar to the two rejections above, it is conceded in the Final Office Action that Larson's annular collar 18 does not disclose all the features of the claimed invention and Rose is relied upon to teach the missing features.

It is respectfully believed that Larson and Rose are not combinable because the alleged combination suffers from the same deficiencies as described above. Applicants reiterate that the alleged combination is improper in the absence of applicants' disclosure because the references lack a suggestion or motivation to combine Rose's tie rod clamp with Larson's bearing assembly or a bearing assembly of any kind. Applicants respectfully request withdrawal of this rejection and an allowance of claims 1 and 2.

Applicants' Answer to Examiner's Response to Arguments

The Final Office Action includes arguments by the Examiner under the section heading "Response to Arguments" at paragraph 5. Since these arguments were first raised in the Final Office Action, applicants did not have an opportunity to respond to these arguments and, thus, applicants hereby address these arguments below.

In the Final Office Action, the Examiner stated that applicants' response filed January 26, 2004 was unpersuasive to reverse the claim rejections:

Applicant argues that the clamp of Ross would not be usable on a rotating shaft because of its ears 24 which are located asymmetrically relative to the axis of the shaft, whereby the asymmetric ears would produce an unbalanced assembly and a rotating hazard to workers. First, this argument is not persuasive because it is not commensurate with the scope of the claim because claim 1 does not define the shaft as "rotating." Second, Mansfield

does not disclose the shaft as rotating at a “high speed” and a slow rotating shaft would not require a balanced clamping device. Further, the rotating shaft of Mansfield may only rotate 20 degrees and therefore would not require a balanced clamping device. With respect to the argument of the ears creating a work place hazard, it is typically required in industry to protect all rotating assemblies with a guard member, and therefore a guarded clamping device would not pose a hazard to a worker. Accordingly, the rejection based on Mansfield or Koss et al. in view of Ross has not been withdrawn.

The Examiner has presented specious arguments which were raised for the first time in the Final Office Action. Applicants understand that the Examiner would require that each and every claim relating to a bearing assembly must recite a “rotatable shaft.” However, this requirement is unnecessary based on the known teachings of a bearing assembly. A rotatable shaft is an inherent characteristic of a bearing assembly because the purpose of the bearing assembly is to accommodate the rotational movement of the shaft.

It is further noted that Mansfield, Koss and Larson which have been relied upon by the Examiner each have claims which do not recite that the shaft is rotatable. In Mansfield, claim 1 recites, inter alia, “a one piece inner race adapted to be applied to a cylindrical shaft” (column 5, lines 29-31). In Koss, the claims also recite a “shaft” without specifically reciting that the shaft is rotatable. Similarly, the claims of Larson recite a “shaft” but do not describe a “rotatable shaft.” The claims of these three patents demonstrate that the inclusion of the word “rotatable” is an unnecessary restriction imposed by the Examiner. Therefore, the claims should be allowable without conformity to this unnecessary restriction.

Further, applicants note that the Examiner’s comments concerning Mansfield and the speed or degree of rotation are also flawed. Mansfield’s bearing assembly, as any conventional bearing assembly, accommodates a full range shaft rotation without limitation as to the degree or speed of

rotational movement. The Examiner improperly imposes conditions on Mansfield's bearing assembly to limit the degree of rotation and speed of the shaft merely to support the alleged combination of Mansfield's bearing assembly with Rose's clamp. Such conditions have been arbitrarily placed upon Mansfield where no support exists in Mansfield's disclosure. If Mansfield limited the rotational movement to 20 degrees at a slow rotating shaft speed, then these conditions would suggest that no bearing assembly would be needed at all. Therefore, Mansfield's bearing assembly and Rose's clamp would not be combinable even under the arbitrary conditions imposed by the Examiner.

Conclusion

For these reasons, independent claim 1 is respectfully believed to be distinguishable over the cited references. Dependent claim 2 which depends directly from claim 1 is also believed to be distinguishable for the same reasons.

A check in the amount of \$165.00 is enclosed to cover the fee for the filing of this appeal brief. Authorization for any deficiency of fees is hereby given to charge deposit account no. 50-1039. (A duplicate copy of this document is enclosed.)

Respectfully submitted,



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(9) APPENDIX

CLAIMS:

1. A bearing assembly comprising an inner ring for mounting on a shaft, an outer ring disposed concentrically about said inner ring, a plurality of roller elements interposed between said inner and outer rings, said inner ring including fingers extending axially from a side thereof and terminating in outer annular end walls, a compressible annular locking collar positioned circumferentially about said fingers, said locking collar having a larger inside diameter and a smaller inside diameter, said larger inside diameter having an axial length not greater than the axial length of said fingers, said larger inside diameter sized to fit over and engage said fingers, said smaller inside diameter sized to define an annular, radially extending wall which engages said outer annular end walls of said fingers, and said locking collar having a fastener screw operable for causing said larger diameter of said locking collar to compress said fingers into locking engagement with said shaft.

2. The bearing assembly of claim 1 in which said axial length of said larger inside diameter is less than said axial length of said fingers.